

**REMARKS**

Entry of the foregoing, reexamination and reconsideration of the application identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.111 and in light of the remarks which follow, are respectfully requested.

At the outset, submitted herewith is a verified English translation of French Patent Application No. 98/08258 filed June 25, 1998, to which the present application claims the benefit of priority. Consideration of the English translation of the priority document is respectfully requested.

By the above amendments, claims 23-33 have been amended for clarification purposes to depend from claim 22. Claim 22 has been amended for clarification purposes to recite the phrase "providing water in vapor phase to an evaporator, and vaporizing the aminonitrile by feeding the aminonitrile in liquid phase to the evaporator," as well as the phrase "wherein the aminonitrile in liquid phase is contacted with the water vapor in the evaporator, and subsequently introducing the resulting mixture of aminonitrile and water vapor into a hydrolysis reactor in which the resulting mixture is contacted with the catalyst." Claim 28 has been amended to delete preferred temperature ranges therefrom (which are recited in claims 36 and 37). Claim 31 has been amended for clarification purposes to recite "an absolute pressure of from 1 to 3 bar."

Support for claim 22 as amended can be found in the verified English translation at least at page 2, lines 15-19, taken in connection with page 1, lines 6-11, page 7, line 23 to page 8, line 3, and page 4, line 21 to page 6, line 3. Support for dependent claims 23-39 can be found in the verified English translation at least at pages 9-11 (claims 2-13).

In the Official Action, claims 23-33 stand rejected under 35 U.S.C. §112, second paragraph, for depending from a canceled claim. In response, claims 23-33 have been amended to depend from claim 22. Claim 28 has been rejected for reciting the term "preferably." Such term has been deleted from claim 28 by the above amendments. Accordingly, for at least the reasons set forth above, withdrawal of this rejection is respectfully requested.

Claims 22-39 stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 3,658,810 (*Tanaka et al*), or International Publication No. WO 98/37063 (WO '063), or International Publication No. WO 96/22974 (WO '974). Withdrawal of this rejection is respectfully requested for at least the following reasons.

According to one aspect of the present invention as defined by claim 22, a process is provided for producing a lactam by a reaction between water vapor and an aminonitrile in vapor phase and in presence of a catalyst. The process comprises providing water in vapor phase to an evaporator, and vaporizing the aminonitrile by feeding the aminonitrile in liquid phase to the evaporator, wherein the aminonitrile in liquid phase is contacted with the water vapor in the evaporator, and subsequently introducing the resulting mixture of aminonitrile and water vapor into a hydrolysis reactor in which the resulting mixture is contacted with the catalyst.

*Tanaka et al* does not disclose or suggest each feature of the present invention. For example, *Tanaka et al* does not disclose or suggest providing water in vapor phase to an evaporator, vaporizing the aminonitrile by feeding the aminonitrile in liquid phase to the evaporator, and subsequently introducing the resulting mixture of aminonitrile and water vapor into a hydrolysis reactor, as recited in claim 22. By comparison, *Tanaka et al* discloses that "the above starting material is fed into the reaction system, and steam is continuously introduced into

the system and the starting material is contacted with the steam" (col. 3, lines 6-8). *Tanaka et al* also discloses that "[t]he starting material can be fed into the reaction system either batchwise or continuously, as solid or as an aqueous solution" (col. 4, lines 39-41). Clearly, *Tanaka et al* discloses feeding the starting material directly to the "reaction system," and has no recognition or suggestion of vaporizing aminonitrile by feeding same to an evaporator prior to introducing the vaporized aminonitrile into a reactor.

Applicants have found that the manner in which aminonitrile and water are vaporized in a process for producing a lactam can have significant effects (specification at page 1, lines 18 and 19). For example, forming a liquid water/aminonitrile mixture and then heating the mixture to a temperature sufficient to vaporize same can result in the formation of heavy compounds which are capable of attaching to and reducing the service life of the catalyst (specification at page 1, lines 20-27). Advantageously, by vaporizing the aminonitrile by feeding the aminonitrile in liquid phase to the evaporator and subsequently introducing the resulting mixture into a hydrolysis reactor in which the resulting mixture is contacted with the catalyst, Applicants have found that the formation and attachment of such heavy compounds to the catalyst can be significantly reduced or eliminated.

*Tanaka et al* has no recognition or suggestion of vaporizing the aminonitrile by feeding the aminonitrile in liquid phase to the evaporator and subsequently introducing the resulting mixture into a hydrolysis reactor in which the resulting mixture is contacted with the catalyst, as is presently claimed, let alone the advantages associated therewith. Accordingly, for at least the above reasons, withdrawal of the §103(a) rejection based on *Tanaka et al* is respectfully requested.

With respect to *WO '063*, while Applicants disagree with the Patent Office's assertion that the claimed invention is obvious over *WO '063*, it is respectfully noted that *WO '063* does not constitute prior art with respect to the present application. *WO '063* was published on August 27, 1998, not more than one year prior to the June 24, 1999 international filing date of the present application. Thus, *WO '063* does not qualify as §102(b) prior art.

Furthermore, with regard to determining whether a WIPO publication can qualify as §102(e) prior art, M.P.E.P. §706.02(f)(1)(I) states the following:

(3) If the international application has an international filing date prior to November 29, 2000, apply the reference under the provisions of 35 U.S.C. 102 and 374, prior to the AIPA amendments:

\* \* \*

(b) For U.S. application publications and WIPO publications directly resulting from international applications under PCT Article 21(2), never apply these references under 35 U.S.C. 102(e) [emphasis added].

In the present case, *WO '063* has an international filing date of February 10, 1998, which is prior to November 29, 2000. Thus, *WO '063* does not qualify as §102(e) prior art with respect to the present application.

It is noted that *WO '063* was published before the June 24, 1999 international filing date of the present application. However, as discussed above, the present application claims the benefit of priority of French Patent Application No. 98/08258 filed June 25, 1998, a verified English translation of which is filed herewith. The June 25, 1998 filing date of the French priority application predates the August 27, 1998 publication date of *WO '063*. Moreover, the claims are fully supported by the French priority application, as discussed above. As such, in

light of the perfected foreign priority claim, *WO '063* does not qualify as §102(a) prior art with respect to the present application.

Accordingly, for at least the above reasons, withdrawal of the §103(a) rejection based on *WO '063* is respectfully requested.

The Patent Office has also asserted that the claimed invention is obvious over *WO '974*. However, *WO '974* does not disclose or suggest providing water in vapor phase to an evaporator, vaporizing the aminonitrile by feeding the aminonitrile in liquid phase to the evaporator, and subsequently introducing the resulting mixture of aminonitrile and water vapor into a hydrolysis reactor, as recited in claim 22. By comparison, *WO '974* discloses a method for preparing lactam by means of a vapor phase reaction between an aliphatic aminonitrile and water in the presence of a solid catalyst (see abstract). There is simply no disclosure or suggestion of providing water in vapor phase to an evaporator, vaporizing the aminonitrile by feeding the aminonitrile in liquid phase to the evaporator, and subsequently introducing the resulting mixture into a hydrolysis reactor, let alone the advantages associated therewith discussed above.

For at least the reasons set forth above, no *prima facie* case of obviousness exists with respect to the presently claimed invention. Accordingly, withdrawal of the §103(a) rejection is respectfully requested.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such action is earnestly solicited.

Application No. 09/720,598  
Attorney's Docket No. 022701-915

If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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**Attachment to AMENDMENT AND SUBMISSION OF VERIFIED  
ENGLISH TRANSLATION OF PRIORITY DOCUMENT  
dated June 30, 2003**

**Marked-up claims 22-33**

22. (Amended) Process for producing a lactam by a reaction between water vapor and an aminonitrile in vapor phase and in presence of a catalyst, comprising providing water in vapor phase to an evaporator, and vaporizing the aminonitrile by feeding the aminonitrile in liquid phase to the evaporator, [to be in contact] wherein the aminonitrile in liquid phase is contacted with the water vapor in the evaporator, [before contacting] and subsequently introducing the resulting mixture of aminonitrile and water vapor into a hydrolysis reactor in which the resulting mixture is contacted with the catalyst.

23. (Amended) Process according to claim [1] 22, wherein the water vapor is fed at a temperature of from 120 to 600°C.

24. (Amended) Process according to claim [1] 22, wherein the aminonitrile is fed at a temperature of from 20 to 300°C.

25. (Amended) Process according to claim [1] 22, wherein the aminonitrile is fed as a film on a heated surface, in a falling-film evaporator.

26. (Amended) Process according to claim [1] 22, wherein the aminonitrile is atomized in the fed water vapor.

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**Marked-up claims 22-33**

27. (Amended) Process according to claim [1] 22, wherein the resulting mixture of aminonitrile in the water vapor that is obtained is brought rapidly in a heat exchanger to a temperature at which the vaporization of the mixture is complete.

28. (Amended) Process according to claim [1] 22, wherein the resulting mixture of aminonitrile in the water vapor that is obtained is brought to the temperature of reaction between the aminonitrile and water[, preferably to a temperature of from 200 to 450°C and, more preferably, from 250 to 400°C].

29. (Amended) Process according to claim [1] 22, wherein the aminonitrile is a linear or branched aliphatic aminonitrile having 3 to 12 carbon atoms.

30. (Amended) Process according to claim [1] 22, wherein the aminonitrile originates from a hydrogenation to a primary amine function of one of the two nitrile functions of a dinitrile selected from adiponitrile, methylglutaronitrile, ethylsuccinonitrile, dimethylsuccinonitrile, malononitrile, succinonitrile, glutaronitrile and dodecanedinitrile.

31. (Amended) Process according to claim [1] 22, wherein the vaporization of the aminonitrile is conducted under an absolute pressure of from [0.1] 1 to 3 bar.

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**Marked-up claims 22-33**

32. (Amended) Process according to claim [1] 22, wherein the vaporization step is performed with a system without retention of liquid.
  
33. (Amended) Process according to claim [1] 22, wherein the vaporization of the aminonitrile is performed with a dwell time of liquid aminonitrile in the vaporization step being less than or equal to one minute.